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(54) **HEADSET AUDIO ACCESSORY**

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H04M 1/00 (2006.01)

(52) **U.S. Cl.** **455/569.1**; 455/575.1; 455/556.1; 381/80; 381/85

(58) **Field of Classification Search** ... 455/569.1–569.2, 455/575.1–575.6, 556.1–558, 90.3; 381/60, 381/65, 68, 357
See application file for complete search history.

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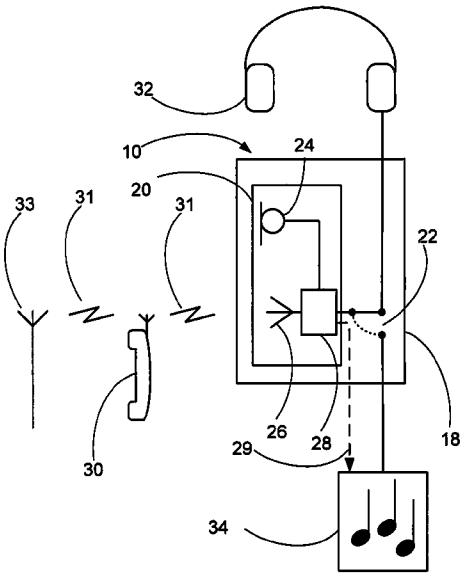
(57) **ABSTRACT**

An audio accessory for a headset. The accessory includes a first circuit for wirelessly receiving audio signals from a first external source of audio signals, a second circuit for mechanically coupling to a second external source of audio signals for receiving the audio signals from the second external source of audio signals, controlling circuitry for controlling the relative amplitude of audio signals from the first external source and the second external source transmitted to a playback device, a connector for detachably coupling to the playback device to transmit audio signals from the controlling circuitry to the playback device, and circuitry communicatingly coupling the controlling circuitry and the connector for transmitting audio signals from the controlling circuitry to the connector.

32 Claims, 9 Drawing Sheets



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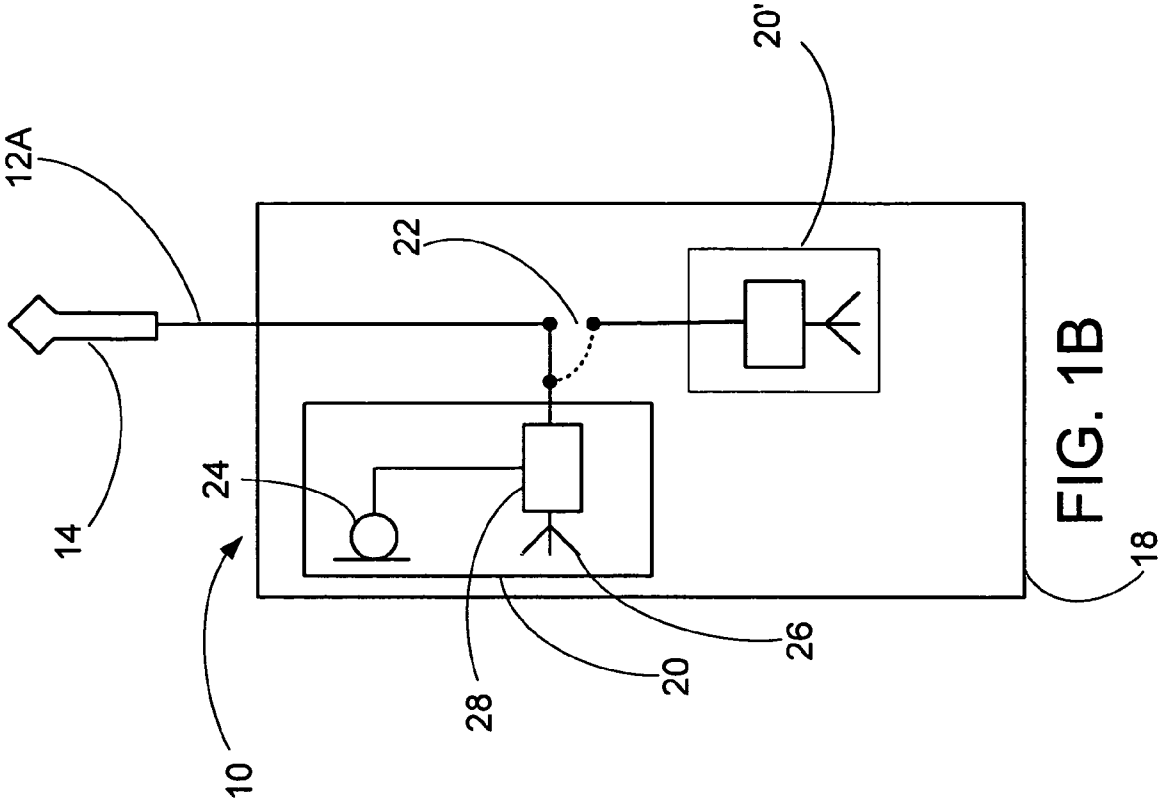


FIG. 1B

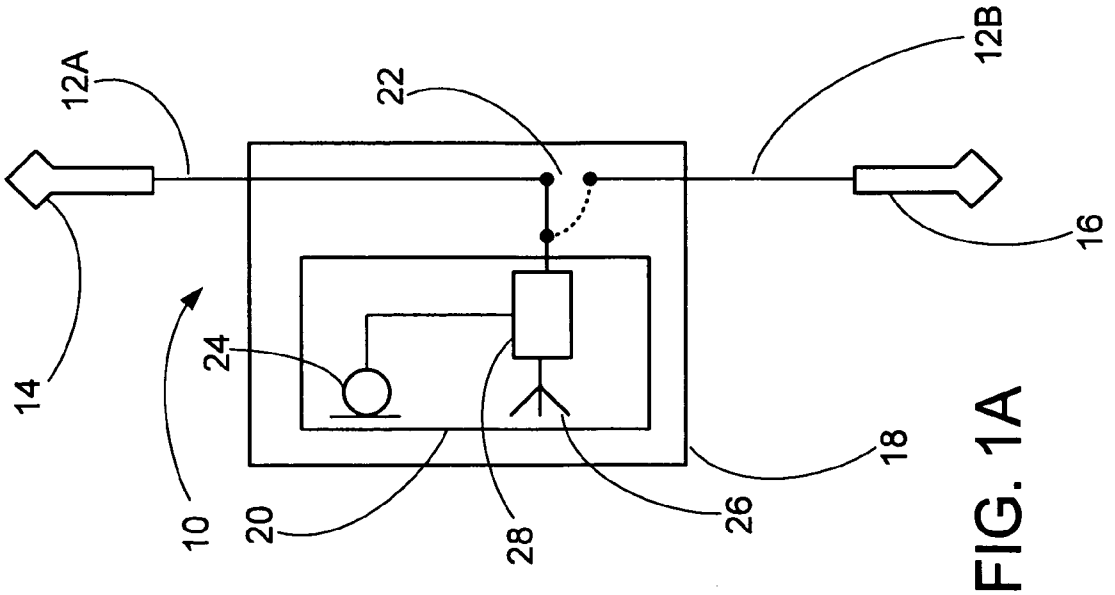
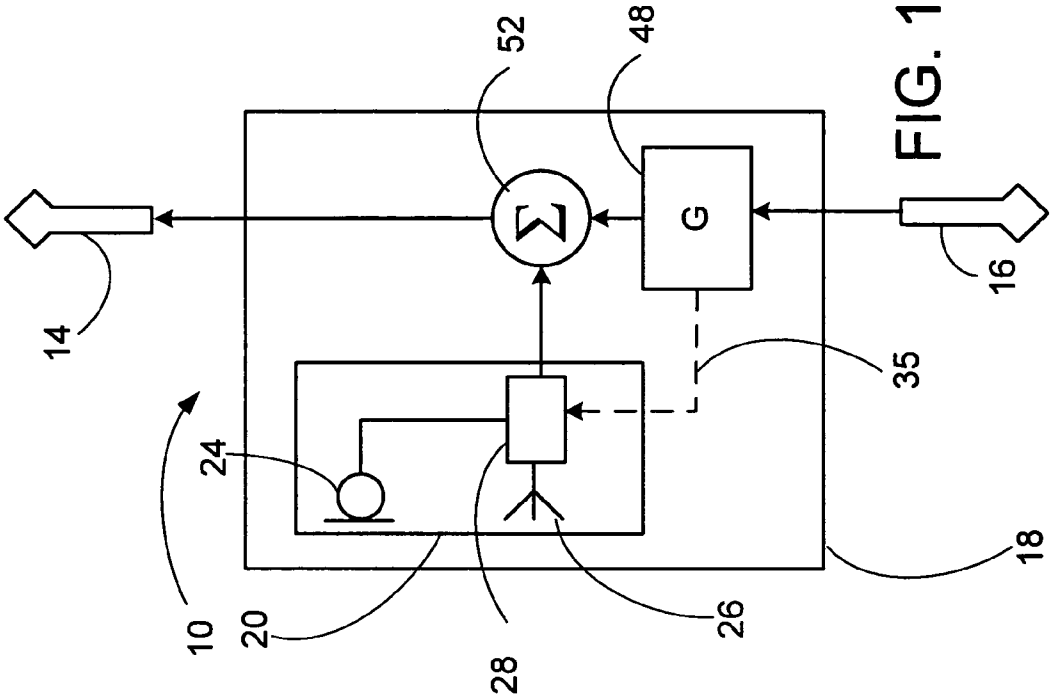


FIG. 1A



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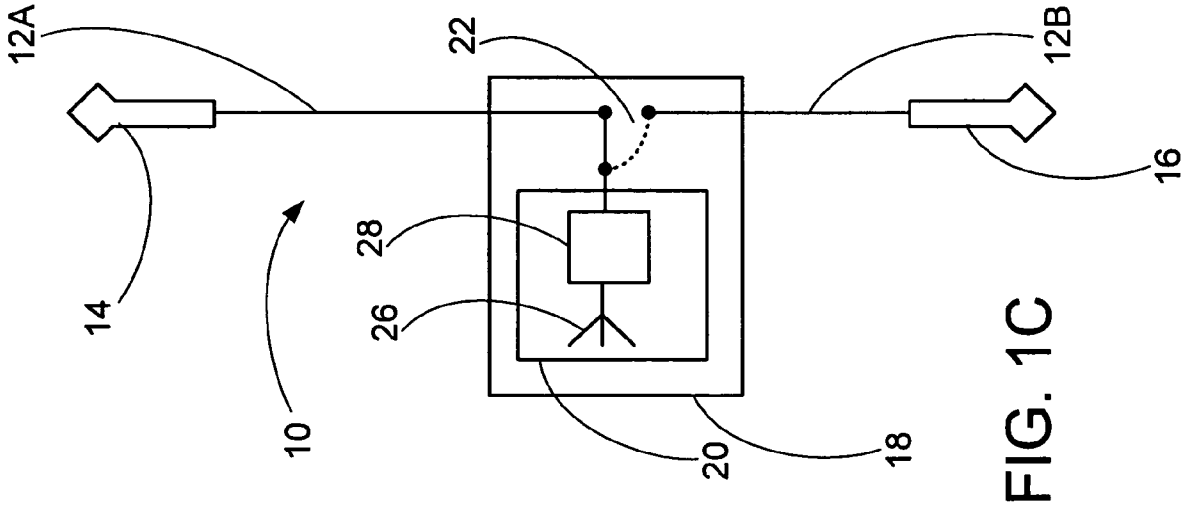

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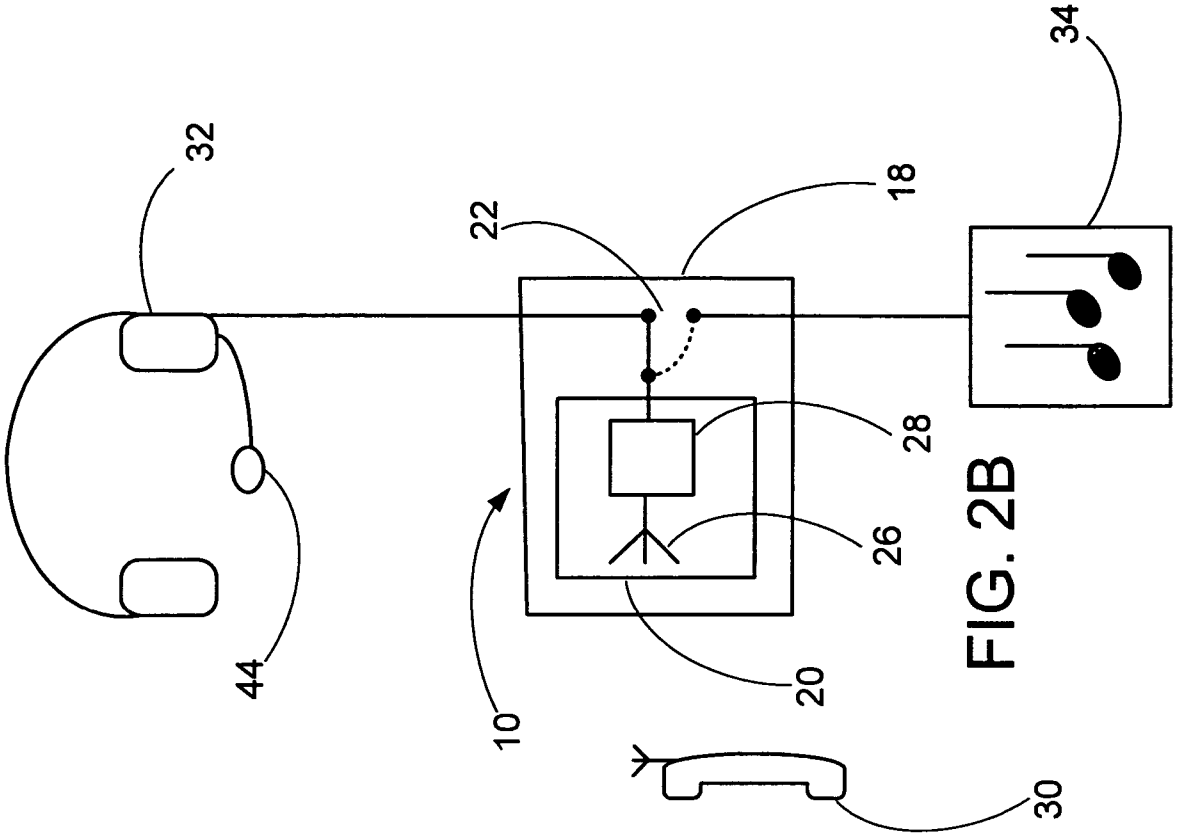


FIG. 2B

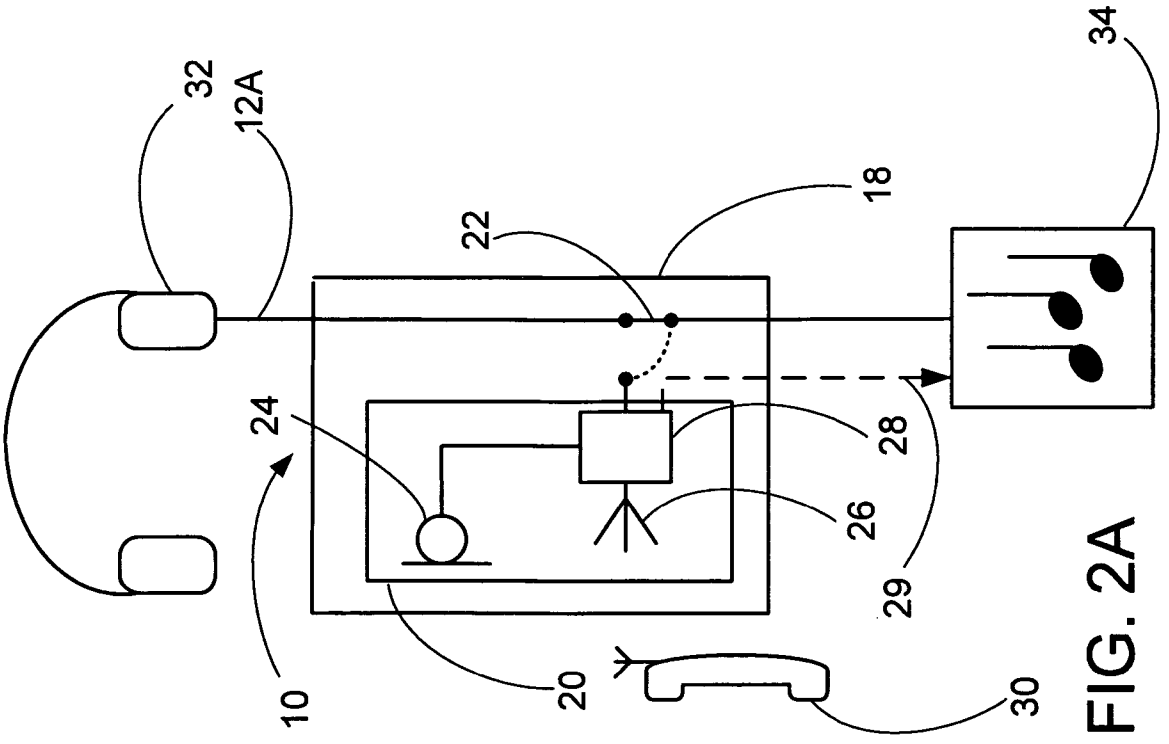
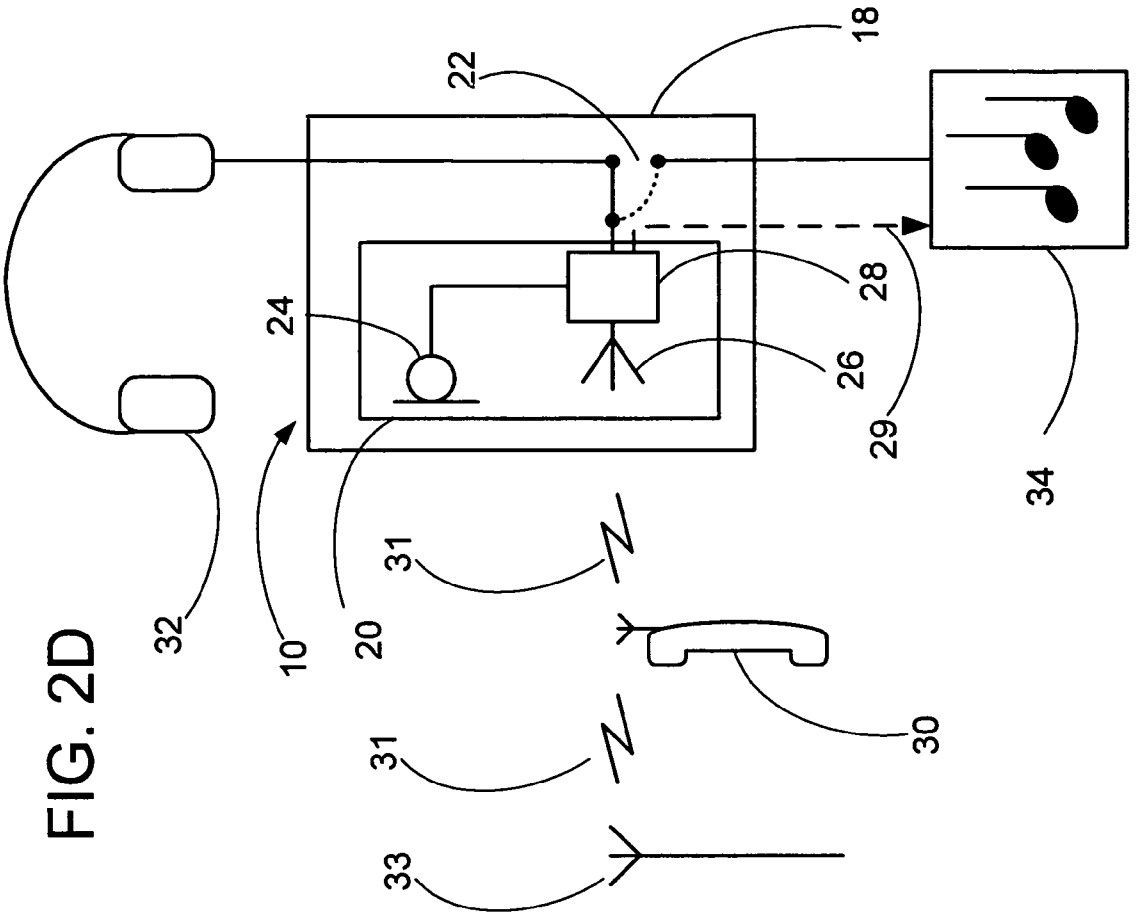


FIG. 2A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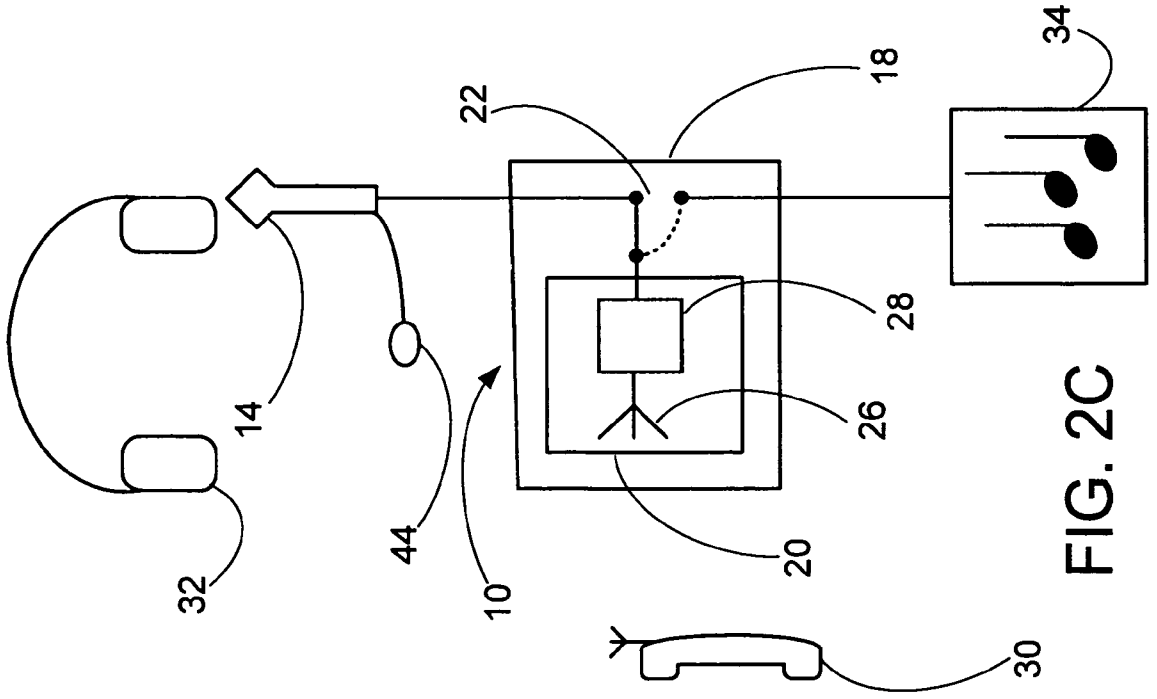
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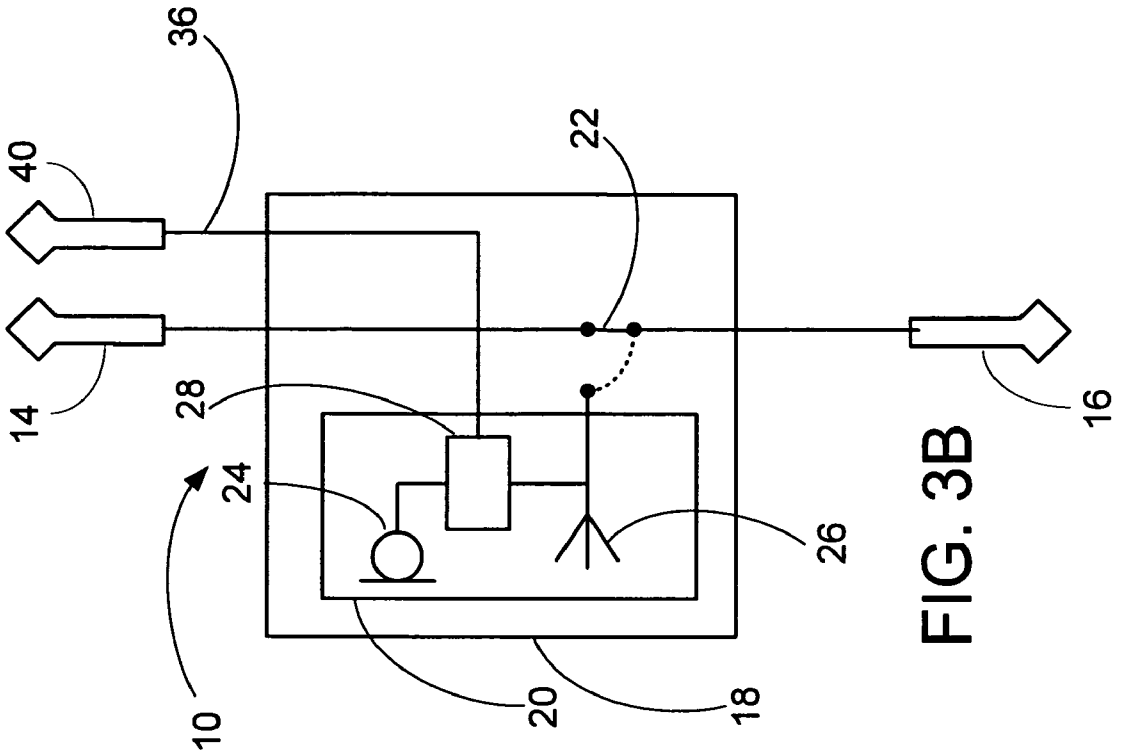

FIG. 3B

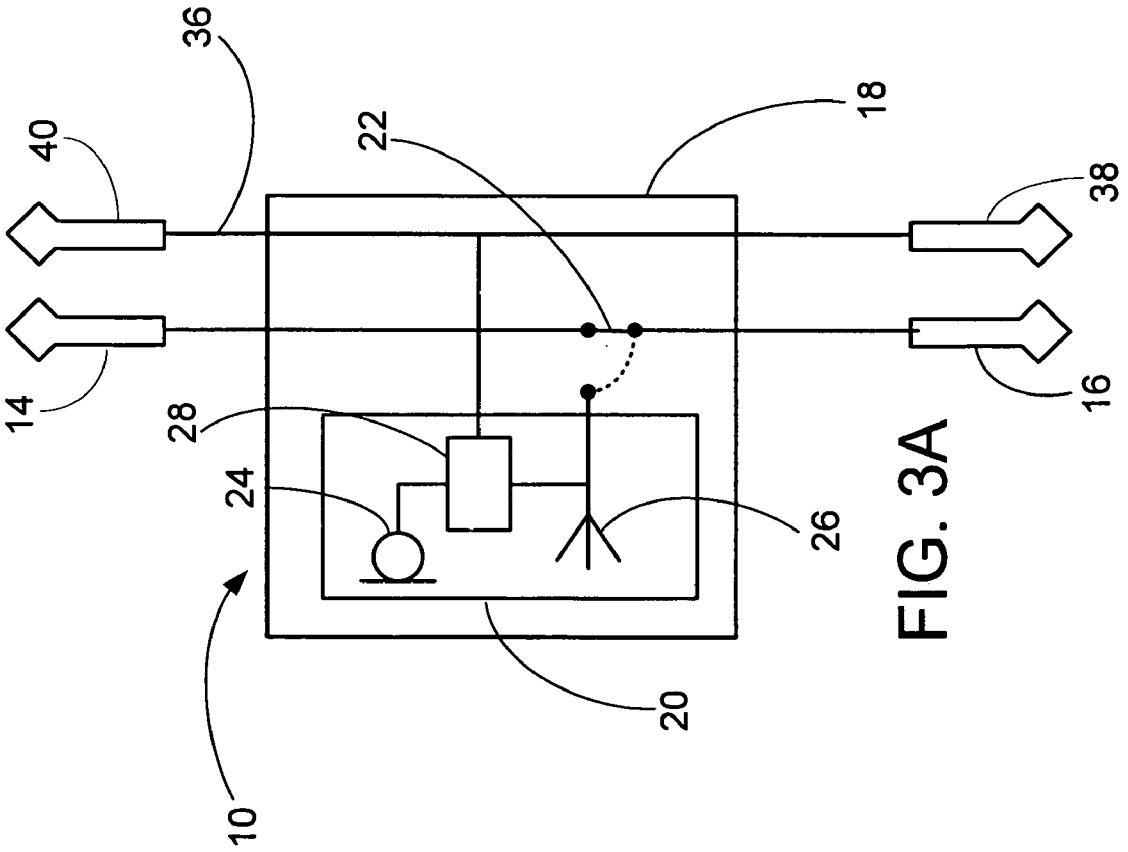

FIG. 3A

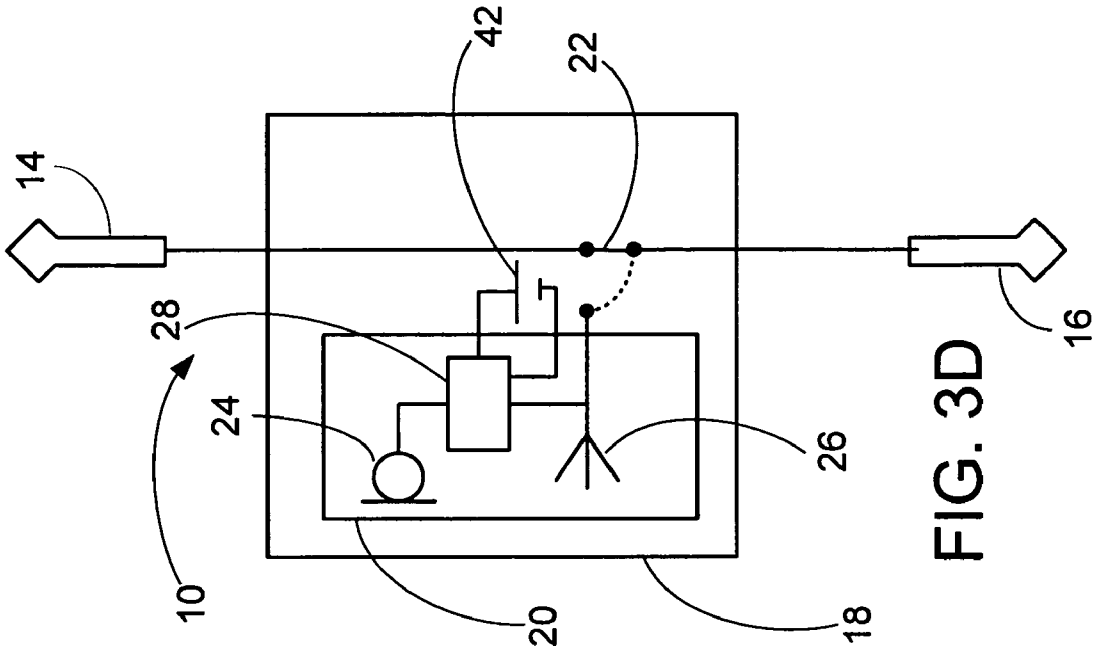

FIG. 3D

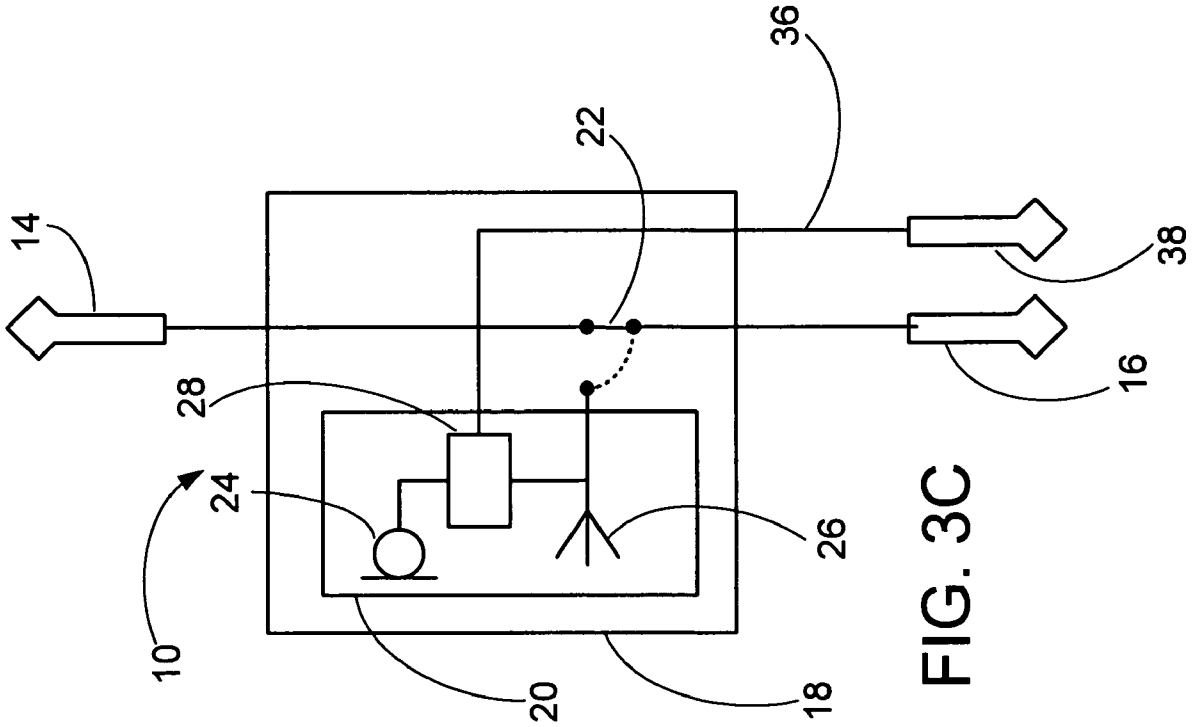

FIG. 3C

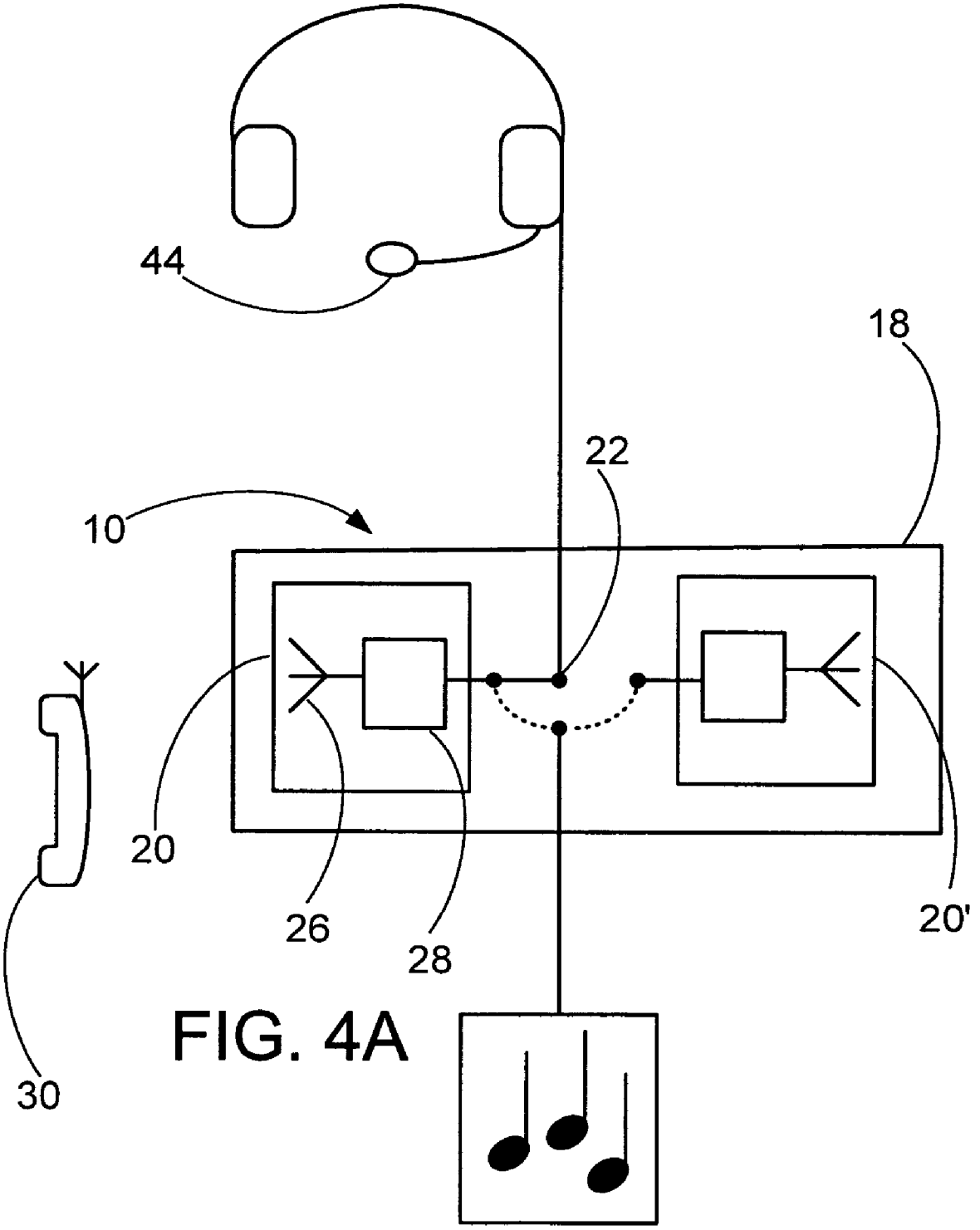

FIG. 4A

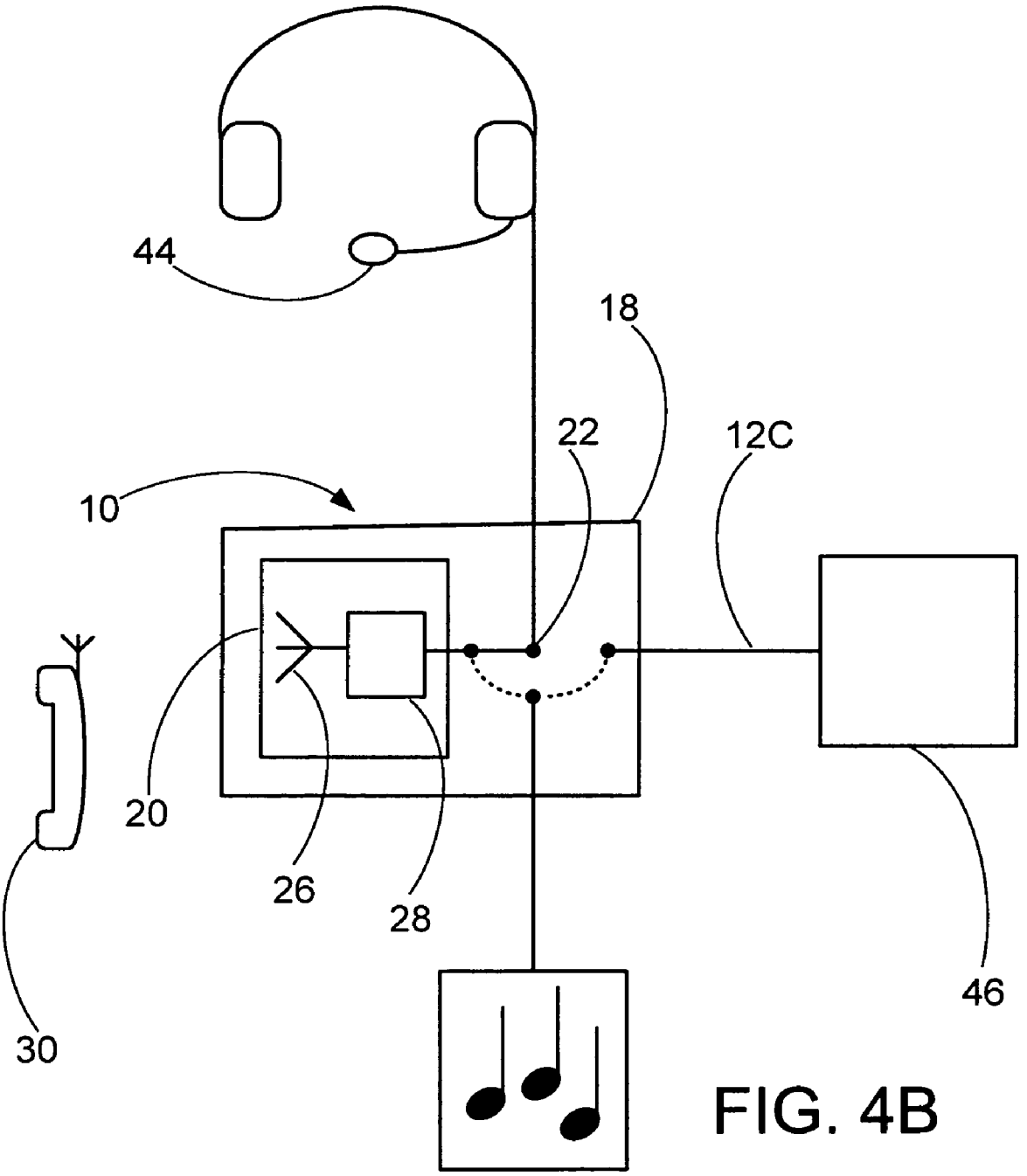

FIG. 4B

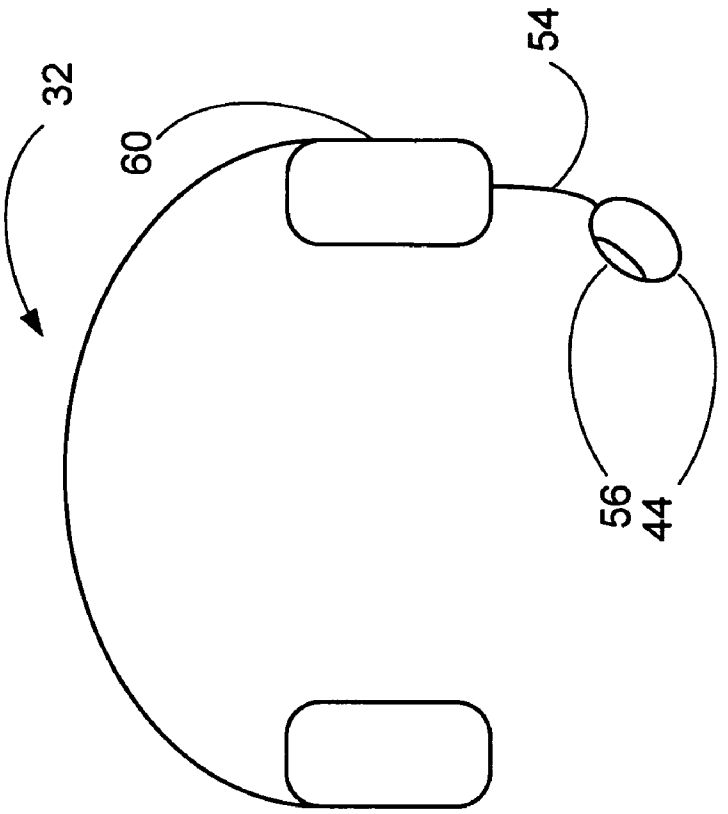

FIG. 5B

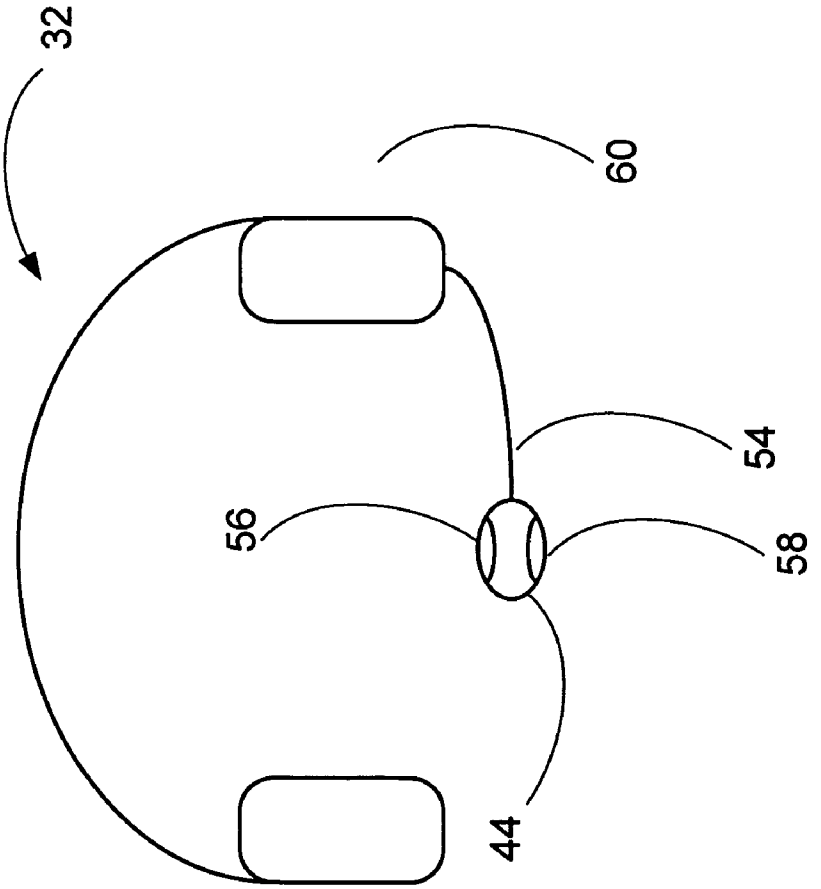

FIG. 5A

HEADSET AUDIO ACCESSORY

BACKGROUND

This specification describes an audio accessory intended for use with a headphone or a headset to manage multiple sources of audio signals.

SUMMARY

In one aspect of the invention, an audio accessory includes a first circuit for wirelessly receiving audio signals from a first external source of audio signals; a second circuit for mechanically coupling to a second external source of audio signals for receiving the audio signals from the second external source of audio signals; controlling circuitry for controlling the relative amplitude of audio signals from the first external source and the second external source transmitted to a playback device; a connector for detachably coupling to the playback device to transmit audio signals from the controlling circuitry to the playback device; and circuitry communicatingly coupling the controlling circuitry and the connector for transmitting audio signals from the controlling circuitry to the connector. The second circuit may be constructed and arranged to wirelessly receive audio signals. The connector may be constructed and arranged to mate with a headset. The first external audio signal source may be a cellular telephone and the audio accessory may further include a microphone for providing voice audio signals and circuitry constructed and arranged to transmit the voice audio signals from the microphone to the cellular telephone. The microphone may be a boom microphone includes a boom assembly and the circuitry may be constructed and arranged to transmit the voice audio signals from the microphone and the connector may include circuitry integrated into the boom assembly coupling the microphone and the connector. The connector may be constructed and arranged to mechanically and electrically couple the boom microphone to a headset. The audio accessory may be configured so that the boom microphone has a retracted position and an unretracted position. In the retracted position, the boom microphone may be configured as an omnidirectional microphone and in the unretracted position, the boom microphone may be configured as a bidirectional microphone. The controlling circuitry may include a switch to select audio signals from one of the first circuit and the second circuit, and the audio accessory may be configured so that moving the boom microphone from the retracted position to the unretracted position causes the switch to select the audio signals from the first circuit. The microphone may be a noise reducing microphone. The audio accessory may further include a cable constructed and arranged to transmit electrical power to at least one of the audio accessory, the first audio signal source and the second audio signal source. The controlling circuitry may include a switch for alternately selecting from the audio signals from the first audio signal source and audio signals from the second audio signal source for transmission to the connector. The audio accessory may further include a third circuit for receiving audio signals from a third audio signal source and the selecting circuitry may be constructed and arranged to alternatively select audio signals from the first external source, the second external source, and the third external source for transmission to the external playback device. The audio accessory may further include circuitry for pausing the operation of the external source generating the nonselected audio signals. The audio accessory may further include circuitry for communicating with a third external source of audio signals. The circuitry for communicating with a third external source of audio signals and the first circuit may share physical components. The communicatingly coupling circuitry may be an electrical cable. The audio accessory may further include circuitry for generating a side tone for transmission to the external playback device.

In another aspect of the invention, the headset assembly, includes: a headset; a accessory device for providing audio signals to the headset through a single input jack of the headset, the accessory device includes receiving circuitry for receiving audio signals from a plurality of audio signal sources, the receiving circuitry includes circuitry for wirelessly receiving audio signals from a wireless transmitter, and controlling circuitry for controlling the relative amplitude of audio signals from the plurality of audio signal sources for transmission to the headset through the single input jack. The receiving circuitry for wirelessly receiving audio signals may be constructed and arranged to receive audio signals wirelessly transmitted from a cellular telephone. The headset may further include a microphone for transducing pressure waves to voice audio signal and the accessory device may be further constructed and arranged to transmit the voice audio signals from the microphone to the cellular telephone. The accessory device may further include a boom microphone, wherein a plug and the single input jack mechanically couple the accessory device to the headset. The accessory device may be further constructed and arranged to transmit electrical power from the headset to the receiving circuitry. The controlling circuitry may includes a switch for alternatively selecting audio signals from one of the plurality of audio signal sources and another of the plurality of audio signal sources for transmission to the headset through the single input jack. The accessory device may further include circuitry for pausing the operation of the source of the nonselected audio signals.

In another aspect of the invention, a method for operating a personal audio system, includes wirelessly receiving first audio signals from a first audio signal source; receiving second audio signals from a second audio signal source; controlling the relative amplitude of the first audio signals and the second audio signals for transmission to a playback device to provide amplitude controlled first audio signals and second audio signals; and transmitting the amplitude controlled first and second audio signals through a single cable to the playback device. The receiving the second audio signals may include wirelessly receiving the second audio signals. The first audio signal source may include a cellular telephone, and the method may further include transducing pressure waves to voice audio signals and transmitting the voice audio signals to the cellular telephone. Transmitting the voice audio signals may include transmitting the voice audio signals through the single plug, jack, and cable. The method may further include providing electrical power from the playback device to at least one of circuitry for receiving the first audio signals, circuitry for receiving the second audio signals, and circuitry for controlling the relative amplitude of the first audio signals and the second audio signals. The controlling may include alternatively selecting audio signals from one of the first audio signal source and the second audio signal source for transmission to the playback device. The method may further include pausing the audio signal source providing the nonselected signals. The method may further include providing a side tone to the playback device.

In another aspect of the invention, a headset includes a headset; a accessory device for providing audio signals to the headset through a single input jack of the headset. The accessory device includes receiving circuitry for receiving audio signals from a plurality of audio signal sources. The receiving circuitry includes circuitry for wirelessly receiving audio sig-

nals from a wireless transmitter; a switch for selecting one of receiving audio signals from the wireless transmitter and not receiving audio signals from the wireless transmitter. The headset includes a boom microphone having a first position near a user's mouth and a second position not near a user's mouth. The headset assembly is configured so that moving the boom microphone from the second position to the first position causes the switch to select receiving audio signals from the wireless transmitter. The first position may be an unretracted position and the second position may be a retracted position.

In another aspect of the invention, a headset includes a boom microphone having a first position near a user's mouth and a second position not near a user's mouth. The boom microphone may be configured as a bidirectional microphone in the first position and an omnidirectional microphone in the second position. The first position may be an unretracted position and the second position may be a retracted position.

In yet another aspect of the invention, an accessory for use with a headset, includes a boom microphone having a first position near a user's mouth and a second position not near a user's mouth and further includes a connector, for connecting the boom microphone to a device includes two selectable sources of audio signals. The boom microphone may be constructed and arranged to select one of the audio sources in the first position and the other of the audio sources in the second position. The boom microphone may be constructed and arranged to non-exclusively select one of the audio signal sources in the first position and exclusively select the other of the audio signal sources in the second position. The first position may be an unretracted position and the second position may be a retracted position.

Other features, objects, and advantages will become apparent from the following detailed description, when read in connection with the following drawing, in which:

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

FIGS. **1**A-**1**D are diagrammatic views of an audio accessory device;

FIGS. **2**A-**2**D are diagrammatic views of a personal audio system including the accessory device of FIGS. **1**A and **1**B;

FIGS. **3**A-**3**D are diagrammatic views of an audio accessory device;

FIGS. **4**A and **4**B are diagrammatic views of an expanded personal audio system; and

FIGS. **5**A and **5**B are diagrammatic views of a headset.

DETAILED DESCRIPTION

Though the elements of several views of the drawing may be shown and described as discrete elements in a block diagram and may be referred to as "circuitry", unless otherwise indicated, the elements may be implemented as one of, or a combination of, analog circuitry, digital circuitry, or one or more microprocessors executing software instructions. The software instructions may include digital signal processing (DSP) instructions. Unless otherwise indicated, signal lines may be implemented as discrete analog or digital signal lines, as a single discrete digital signal line with appropriate signal processing to process separate streams of audio signals, or as elements of a wireless communication system. Unless otherwise indicated, audio signals may be encoded in either digital or analog form. In this specification, an "earphone" refers to a device to fit in, on, or around an ear, typically including structure for sealing in, to, or around the ear, and including an acoustic driver to radiate acoustic energy into an earphone cavity. According to industry usage, the term "headphone" is frequently used to refer to a device including two earphones typically connected by a headband, but not including a microphone and the term "headset" refers to a device having a microphone either connected to it or as an integral part of it. Because the devices described in this specification are designed to be used with a headset or be used with a headphone to form a headset, the term "headset" is used throughout. In the several views of the drawing, some elements, such as accessory device **10**, module **18**, and others have different configurations in some of the views. The same reference numeral will be used throughout the specification, and the differences between the elements in the several views will be noted in the specification.

FIGS. **1**A-**1**D show an audio accessory device intended to be used with a headset to form elements of a personal audio system. In FIG. **1**A, an accessory device **10** includes a module **18**, coupled to playback device detachable connector element **14** by cable portion **12**A and coupled to audio signal source detachable connector element **16** by cable portion **12**B. Module **18** includes wireless communication circuitry **20** and switch **22**, which alternatively couples wireless communication circuitry **20** and audio signal source detachable connector element **16** to playback device detachable connector element **14**. Wireless communication circuitry **20** may include a microphone **24**, antenna **26**, and processing circuitry **28**, which may include radio circuitry and signal processing circuitry. In FIG. **1**B, cable portion **12**B and audio signal source detachable connector element **16** of FIG. **1**A are replaced by wireless communication circuitry **20'**. In FIG. **1**C, the microphone **24** is absent so that accessory device **10** has no microphone. In devices using the configuration of FIG. **1**C, there may be a microphone as a part of another component of a personal audio system, as will be described below. In the implementation of FIG. **1**D, switch **22** is replaced by circuitry including amplifier **48** coupled to audio signal source detachable connector element **16** and to summer **52**, which is coupled to playback device detachable connector element **14**. Amplifier **48** may also be coupled to processing circuitry **28**. The audio accessory device may include other amplifiers, which are not shown.

FIGS. **2**A-**2**C show one of the accessory devices **10** of FIGS. **1**A and **1**C as a component of various configurations of a personal audio system, illustrating how the accessory device functions. In FIG. **2**A, playback device detachable connector element **14** (not shown in this view) is detachably mated with an input jack of headset **32**. Wireless communication circuitry **20** is constructed and arranged to communicate wirelessly with cellular telephone **30**. Audio signal source detachable connector element **16** (not shown in this view) is detachably mated with an output jack of audio signal source **34**. Optional control line **29** may couple processing circuitry **28** and audio signal source **34**. FIG. **2**B shows the microphoneless accessory device **10** of FIG. **1**C mated with the input jack of a headset **32** equipped with a microphone, such as a boom microphone **44**. In the configuration of FIG. **2**B, detachable connector element **14** (not identified in this view) and cable portion **12**A are configured to transmit the audio signal from the boom microphone **44** to wireless communication circuitry **20**. In the implementation of FIG. **2**C, boom microphone **44** is a component of accessory device **10**. Playback device detachable connector element **14** may couple, electrically and mechanically, boom microphone **44** and module **18** to headset **32** via a jack in headset **32**.

Referring to FIG. **2**D, the operation of the accessory device will be described using the configuration of FIG. **2**A, it being

understood that the configuration of FIGS. **2**B and **2**C may function in a similar manner. In normal operation, accessory device **10** transmits to headset **32** audio signals from external audio signal source **34** as shown in FIG. **2**A. If an audio signal transmission is received by wireless communication circuitry **20** from an external audio signal source such as cellular phone **30** (as indicated by wireless transmission symbols **31** and remote wireless transmission device **33** of FIG. **2**D), the position of switch **22** is changed, as shown in FIG. **2**D, so that signals from wireless communication circuitry **20** are transmitted to headset **32**, causing microphone **24** and headset **32** to act as components of a "hands free" cellular telephone system. Prior to the changing of the position of switch **22**, the accessory device may transmit a control signal over optional control line **29** to the audio signal source **34** to pause the transmission of audio signals from audio signal source **34** to headset **32**. When the communication from cellular telephone **30** to wireless communication circuitry is terminated, the position of switch may change so that audio signals may resume being transmitted from audio signal source **34** to headset **32**. If necessary, a control signal may be transmitted to audio signal source **34** over optional control line **29** to unpause the transmission of audio signals from audio signal source **34** to headset **32** so that the musical piece that the user was listening to resumes from the same point in the musical piece as it was prior to the pause. If cellular telephone **30** does not generate a side tone, wireless communication circuitry **20** may be constructed and arranged to generate the side tone. A side tone is an audio signal proportional to the microphone signal that is transmitted to the headset **32** to allow the user to hear through the headset **32**, what the user says. A side tone is especially desirable if the headset **32** is a high performance passive or active noise reduction headset. In a high performance noise reduction headset, the attenuation of the user's own voice may result in the user not being able to hear him/her self well, which seems unnatural or uncomfortable. If the side tone is not provided locally (for example if the side tone is provided by transmitting from microphone **24** to cellular telephone **30**, from cellular telephone **30** to processing circuitry **28** to headset **32** using a compressed wireless link), the delay may be annoying. If a side tone is generated it is desirable for microphone **24** to be a noise reducing microphone (for example a bi-directional microphone located in close proximity to the mouth) so that the side tone does not include ambient noise that the noise reducing headset is designed to attenuate. If the implementations of FIGS. **2**A-**2**D are implemented with the accessory device of FIG. **1**D, a user of headset **32** could hear both sound transmitted through wireless communication circuitry **20** and sound corresponding to audio signals from audio signal source **34**, as indicated by the mixing of the audio signals at summer **52** of FIG. **1**D. Optionally, a person conversing with the headset user over the wireless communication circuitry **20** could hear both sound from the headset user and sound corresponding to signals from audio signal source **34**. The gain G of amplifier **48** of FIG. **1**D can be controllable to permit the user of the headset to control the relative amount of sound from the wireless communication circuitry and sound from the audio signal source **34** and optionally to control the relative amount of sound from the microphone **24** and the sound from the audio signal source **34** as indicated by signal line **35**. If the gain G of amplifier **48** of FIG. **1**D is zero when there is transmission from wireless communications circuitry **20** and unity when there is no transmission from wireless communications circuitry **20**, an audio accessory device of FIG. **1**D functions equivalently to the audio accessory device of FIG. **1**A. In another alternative, the function of switch **22** could be implemented as muting circuitry that, in the event of transmission from wireless communications circuitry **20**, mutes the input from audio signal source **34**.

In one embodiment, cable portions **12**A and **12**B may be conventional stereo audio cable. Playback device detachable connector element **14** and audio signal source detachable connector element **16** may be a plug constructed and arranged to mate with a 3.5 mm stereo jack to detachably couple the accessory device **10** to playback device such as headset **32** or to an external music source **34**, respectively. Module **18** may be implemented as a so-called "dongle" between cable portions **12**A and **12**B. Antenna **26** and processing circuitry **28** may be conventional elements associated with wireless "hands free" devices for cell phone systems. Cell phone **30** may be a conventional cell phone adapted to transmit wirelessly according to voice bandwidth hands-free profile (HFP) or the headset profile (HSP) of the Bluetooth wireless communications standard defined by the Bluetooth Special Interest Group (SIG), available at URL address www.bluetooth.org. For purposes of explanation, switch **22** is shown as a two position switch. In some implementations, switch **22** may be implemented as a suitably programmed digital signal processing (DSP) device so that, for example, control signals can be communicated between processing circuitry **20** and audio signal device **34** as discussed in the description of the function of control line **29**, so that control line **29** can be integrated into cable portion **12**B, and so that the implementations of FIGS. **1**A-**1**C can be implemented with the same components as the implementation of FIG. **1**D. In other implementations, switch **22** may be implemented as a manually or electronically controllable analog switch. Audio signal source **34** may be an MP3 player, such as an iPod® mobile digital device manufactured by Apple Corporation of Cupertino, Calif., or a CD player, or a jack of an audio system of an airplane, or others. Headset **32** may be one of a wide variety of devices, such as a single earbud "hands free" cell phone headset; an interaural, circumaural, or supra-aural stereo passive or active noise reduction headset; or a communications headset; or the like.

FIGS. **3**A-**3**D show the accessory device **10** of FIG. **1**A with an additional feature. The device of FIG. **3**A has the components of FIG. **1**A, and in addition has a power cable **36**, with suitable connectors, such as detachable connector elements **38** and **40** at the two ends. In operation, detachable connector element **38** may be inserted into a power input/output jack of audio signal source **34** and detachable connector element **40** may be inserted into a power output/input of headset **32**. The accessory device of FIG. **3**A permits headset **32** to supply power to audio signal source **34** or permits audio signal source **34** to supply power to headset **32** and permits audio signal source **34** (of FIGS. **2**A-**2**D) or headset **32** (of FIGS. **2**A-**2**D) to supply power for the electronic components of the audio accessory device **10**. If audio signal source **34** and headset **32** each have their own power source, the electronic components of the audio accessory device **10** may be powered by the headset **32**, as shown in FIG. **3**B, or may be powered by the audio signal source **34**, as shown in FIG. **3**C. For clarity of explanation, detachable connector elements **14**, **16**, **38**, and **40** are shown as separate elements. In an actual implementation, detachable connector elements **14** and **40** and detachable connector elements **16** and **38** can be combined in a single plug. Power from the headset and audio source can be managed using the devices and techniques described in U.S. patent application Ser. No. 11/191,873. Power cable **36** may be physically integrated with cable portions **12**A and **12**B. Alternatively, the audio accessory may be powered by an internal battery **42**, as shown in FIG. **3**D. The

configurations of FIGS. **3**A-**3**D can also be implemented with the microphoneless wireless communication circuitry **20**C of FIG. **1**C or **1**C.

An accessory device **10** according to FIGS. **1**-**3** is advantageous over conventional auxiliary input devices because it requires a headset with only one input jack; because it can be adapted to be used with any headset with an input jack; because it allows the user great flexibility in the selection of a cellular telephone component, an audio signal source component, and a headset component of a personal audio system; and because it can be used with a headset that does not contain wireless communications circuitry or circuitry to select between audio signal sources. An accessory device that generates a side tone avoids the unnatural and uncomfortable sensation that may occur when the active or passive noise reduction attenuates the user's own voice and avoids the delay that may result from the transmission of voice signals over a compressed wireless link such as a Bluetooth link.

Referring now to FIGS. **4**A and **4**B, there is shown an expanded personal audio system. The systems of FIGS. **4**A and **4**B have the elements of FIG. **2**B and in addition circuitry for communicating with a third source of audio signals. FIG. **4**A includes, for example second wireless communication circuitry **20'**, which could be for communicating in a wireless intercom network separate from the cell phone network. FIG. **4**B includes an additional cable **12**C and detachable connector element **16** (not shown in this view) for electrically and mechanically connecting with an external device **46**, which could be, for example, a wired local communications system in a building, ship or airliner. The expansion to accommodate the third source of audio signals can be easily done by modification to circuitry in the module **18** such as the switch **22** and does not require redesign of the physical circuitry or the structure of the headset (such as adding additional input jacks). For explanatory purposes, second wireless communications circuitry **20'** is shown as distinct from wireless communications circuitry **20**. In an actual implementation, wireless communications circuitry **20** and second wireless communications circuitry **20'** may share physical components, such as antenna **26**. In some implementations, second wireless communications circuitry **20** may be implemented as DSP instructions operating on wireless communications circuitry **20**.

Referring to FIGS. **5**A and **5**B, there is shown an additional optional feature of the audio device. A headset **32** is mechanically coupled to microphone **44** by a boom **54**. The microphone may be a bidirectional microphone with two opposed ports **56** and **58**. In FIG. **5**A, boom **54** is positioned so that the microphone is near the user's mouth, for example within 4 cm of the corner of the mouth. In FIG. **5**B, boom **54** is positioned so that microphone **44** is not near the user's mouth, for example more than 5 cm from the corner of the mouth. Microphone **44** may be configured so that in the position of FIG. **5**B with the microphone not near the user's mouth, one of the ports **58** is covered so that microphone **44** is an omnidirectional microphone.

Providing the two positions for the boom microphone can be done in a number of ways, for example by hinging the boom or by making boom **54** to be retractable. Boom **54** can be made retractable in a number of ways. For example, it can be made to retract into earphone **60**, into an accessory boom mounting structure attached to earphone **60**, and it can include telescoping sections. In the discussion following, the position near the user's mouth and the position not near the user's mouth are done by making the boom retractable. The features discussed below can also be done by, for example, hinging the boom.

The retraction mechanism can be integrated with circuitry constructed and arranged so that the act of moving the microphone from the position of FIG. **5**B to the position of FIG. **5**A causes wireless communications circuitry **20** to answer a call from cellular telephone **30**. The boom microphone can be used in a similar manner with audio signal source equipped cell phones that store audio signals in some format (such as the MP3 format) and which also function as cell phones. The circuitry may be constructed and arranged so that the act of moving the microphone from the unretracted position of FIG. **5**A to the retracted position of FIG. **5**B the circuitry disconnects from a cell phone call or causes the audio source equipped cell phone to act exclusively as an audio signal source or both. The act of moving the microphone from the retracted position of FIG. **5**B to the unretracted position of FIG. **5**A answers a cell phone call and/or pauses the transmission from the audio source, and causes the audio source equipped cell phone to operate as a cell phone, with the boom microphone providing voice input to the cell phone. In this configuration, the audio signal source equipped cell phone operates either exclusively as a cell phone, or operates as a cell phone in combination with operating as an audio signal source so that the user can hear both transmissions from the cell phone and music corresponding to the audio signals on the audio signal source. The boom microphone may also be configured so that in the retracted position, one of the ports **58** of FIG. **5**A of the bi-directional microphone may be covered, as shown in FIG. **5**B so that the microphone is an omnidirectional microphone. In the position of FIG. **5**A, the microphone can be used in high noise environments to produce a good speech-to-noise ratio and in the position of FIG. **5**B, the microphone can be in a less conspicuous, less distracting, location relative to the user when being used in a low noise environment.

Numerous uses of and departures from the specific apparatus and techniques disclosed herein may be made without departing from the inventive concepts. Consequently, the invention is to be construed as embracing each and every novel feature and novel combination of features disclosed herein and limited only by the spirit and scope of the appended claims.

What is claimed is:

1. An audio accessory comprising:

a first circuit for wirelessly receiving audio signals from a first external source of audio signals;

a second circuit for mechanically coupling to a second external source of audio signals for receiving the audio signals from the second external source of audio signals;

controlling circuitry for controlling the relative amplitude of audio signals from the first external source and the second external source transmitted to a playback device;

a connector for detachably coupling to the playback device to transmit audio signals from the controlling circuitry to the playback device;

circuitry communicatingly coupling the controlling circuitry and the connector for transmitting audio signals from the controlling circuitry to the connector; and

circuitry for generating a side tone proportional to a microphone signal for transmission to the playback device that allows the user to hear what the user says.

2. An audio accessory in accordance with claim **1**, wherein the second circuit is constructed and arranged to wirelessly receive audio signals.

3. An audio accessory in accordance with claim **1**, wherein the connector is constructed and arranged to mate with a headset.

4. An audio accessory in accordance with claim 1, wherein the first external audio signal source is a cellular telephone, the audio accessory further comprising

a microphone for providing voice audio signals and circuitry constructed and arranged to transmit the voice audio signals from the microphone to the cellular telephone.

5. An audio accessory in accordance with claim 4, wherein

the microphone is a boom microphone comprising a boom assembly;

the circuitry constructed and arranged to transmit the voice audio signals from the microphone and the connector comprises circuitry integrated into the boom assembly coupling the microphone and the connector; and

the connector is constructed and arranged to mechanically and electrically couple the boom microphone to a headset.

6. An audio accessory in accordance with claim 5, wherein the audio accessory is configured so that the boom microphone has a retracted position and an unretracted position.

7. An audio accessory in accordance with claim 6, wherein, in the retracted position, the boom microphone is configured as an omnidirectional microphone and in the unretracted position, the boom microphone is configured as a bidirectional microphone.

8. An audio accessory in accordance with claim 5, the controlling circuitry comprising a switch to select audio signals from one of the first circuit and the second circuit, and wherein the audio accessory is configured so that moving the boom microphone from the retracted position to the unretracted position causes the switch to select the audio signals from the first circuit.

9. An audio accessory in accordance with claim 4, wherein the microphone is a noise reducing microphone.

10. An audio accessory in accordance with claim 1, further comprising a cable constructed and arranged to transmit electrical power to at least one of the audio accessory, the first audio signal source and the second audio signal source.

11. An audio accessory in accordance with claim 1, wherein the controlling circuitry comprises a switch for alternately selecting from the audio signals from the first audio signal source and audio signals from the second audio signal source for transmission to the connector.

12. An audio accessory in accordance with claim 11, further comprising a third circuit for receiving audio signals from a third audio signal source, wherein the selecting circuitry is constructed and arranged to alternatively select audio signals from the first external source, the second external source, and the third external source for transmission to the external playback device.

13. An audio accessory in accordance with claim 11, further comprising circuitry for pausing the operation of the external source generating the nonselected audio signals.

14. An audio accessory in accordance with claim 1, further comprising circuitry for communicating with a third external source of audio signals.

15. An audio accessory in accordance with claim 14, wherein the circuitry for communicating with a third external source of audio signals and the first circuit share physical components.

16. An audio accessory in accordance with claim 1, wherein the communicatingly coupling circuitry is an electrical cable.

17. A headset assembly, comprising:

a headset; and

an accessory device for providing audio signals to the headset through a single input jack of the headset, the accessory device comprising

receiving circuitry for receiving audio signals from a plurality of audio signal sources, the receiving circuitry comprising circuitry for wirelessly receiving audio signals from a wireless transmitter;

controlling circuitry for controlling the relative amplitude of audio signals from the plurality of audio signal sources for transmission to the headset through the single input jack; and

circuitry for generating a side tone proportional to a microphone signal for transmission to the headset that allows the user to hear what the user says.

18. A headset assembly in accordance with claim 17, wherein the receiving circuitry for wirelessly receiving audio signals is constructed and arranged to receive audio signals wirelessly transmitted from a cellular telephone.

19. A headset assembly in accordance with claim 18, the headset further comprising a microphone for transducing pressure waves to voice audio signal, the accessory device further constructed and arranged to transmit the voice audio signals from the microphone to the cellular telephone.

20. A headset assembly in accordance with claim 18, the accessory device further comprising a boom microphone, wherein a plug and the single input jack mechanically couple the accessory device to the headset.

21. A headset assembly in accordance with claim 17, wherein the accessory device is further constructed and arranged to transmit electrical power from the headset to the receiving circuitry.

22. A headset assembly in accordance with claim 17, wherein the controlling circuitry comprises a switch for alternatively selecting audio signals from one of the plurality of audio signal sources and another of the plurality of audio signal sources for transmission to the headset through the single input jack.

23. A headset assembly in accordance with claim 22, the accessory device further including circuitry for pausing the operation of the source of the nonselected audio signals.

24. A method for operating a personal audio system, comprising:

wirelessly receiving first audio signals from a first audio signal source;

receiving second audio signals from a second audio signal source;

controlling the relative amplitude of the first audio signals and the second audio signals for transmission to a playback device to provide amplitude controlled first audio signals and second audio signals;

transmitting the amplitude controlled first and second audio signals through a single cable to the playback device and;

generating from an accessory device a side tone proportional to a microphone signal for transmission to the playback device that allows the user to hear what the user says.

25. A method for operating a personal audio system in accordance with claim 24, wherein the receiving the second audio signals comprises wirelessly receiving the second audio signals.

26. A method for operating a personal audio system in accordance with claim 24, wherein the first audio signal source comprises a cellular telephone, the method further comprising

transducing pressure waves to voice audio signals; and

transmitting the voice audio signals to the cellular telephone.

27. A method for operating a personal audio system in accordance with claim **26**, wherein transmitting the voice audio signals comprises transmitting the voice audio signals through the single plug, jack, and cable.

28. A method for operating a personal audio system in accordance with claim **24**, further comprising

providing electrical power from the playback device to at least one of circuitry for receiving the first audio signals, circuitry for receiving the second audio signals, and controlling the relative amplitude of the first audio signals and the second audio signals.

29. A method for operating a personal audio system in accordance with claim **24**, wherein the controlling comprises alternatively selecting audio signals from one of the first audio signal source and the second audio signal source for transmission to the playback device.

30. A method for operating a personal audio system in accordance with claim **29**, further comprising pausing the audio signal source providing the nonselected signals.

31. An audio device comprising:

an active noise reduction headset;

a microphone;

an accessory coupling a cellular telephone to the active noise reduction headset for transmitting audio signals from the microphone to the cellular telephone, the accessory comprising circuitry for generating a side tone proportional to a microphone signal for transmission to the active noise reduction headset that allows the user to hear what the user says.

32. An audio device in accordance with claim **31**, wherein the microphone is a noise reduction microphone.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,627,352 B2
APPLICATION NO. : 11/390718
DATED : December 1, 2009
INVENTOR(S) : Gauger, Jr. et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the Title Page:

The first or sole Notice should read --

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 709 days.

Signed and Sealed this

Second Day of November, 2010

David J. Kappos

David J. Kappos
Director of the United States Patent and Trademark Office